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THE ASSOCIATION REACTION METHOD OF MENTAL DIAGNOSIS (*Tatbestandsdiagnostik*)

By ROBERT M. VERKES and CHARLES S. BERRY

In connection with a course in Applied Psychology, given in the Harvard Summer School during the session of 1908, the association reaction method of mental diagnosis was employed for the purpose of class demonstration. The discovery of this method of studying the content of consciousness is claimed by both Wertheimer and Jung,¹ who, with other psychiatrists and criminologists, have discussed its applications and values from several points of view. Without previous experience in the use of the method and with little hope of success in our efforts to adapt it to the demands made upon a class demonstration experiment, we planned and executed the experiments whose results constitute the material of this report. The success which rewarded our efforts to demonstrate the value of the method to a class of elementary students of Psychology would seem to justify a brief account of our work. We wish to have it clearly understood, however, that we are not attempting a critique of the method of Jung and Wertheimer, and that we do not consider our results in themselves as of special importance. It is our aim merely to call attention to a useful adaptation of the method in the teaching of Psychology.

EXPERIMENT I

We attempted, in our first experiment, to discover which of two possible acts a person had performed. In a room of the laboratory we placed two small boxes, one of which contained a dancing mouse, and the other a pack of playing cards. The boxes were covered, so that their contents could be discovered only by raising the lids. In another room of the laboratory, the classroom, we had arranged a Hipp chronoscope, electrically connected, with a single hand key in the circuit. After the class had assembled in this room we explained briefly what we proposed to do, selected one member of the class to serve as subject for the experiment, and then directed that individual, in the company of the remainder of the class, to go to the room which contained the boxes, open one of them, examine its contents, and, without disturbing the other box, return to

¹ For the literature on "*Tatbestandsdiagnostik*" see bibliography at the end of this article.

the classroom to be tested by the association reaction-time method.

We had previously prepared two lists of thirty words each. In one of them occurred several words which referred directly to the contents of the mouse-box. This we may hereafter call the mouse-box list. In the other occurred certain words which similarly referred to the contents of the card-box. This we may therefore designate as the card-box list. These lists, of experiment 1, appear in tables 1 and 2.

The subject, upon returning to the classroom, was given a seat at one side of the table which carried the chronoscope. On the opposite side sat the experimenter, whose task it was to call the words of the list and manipulate the reaction key. At the end of the table, so seated that he could readily read the chronoscope, was an assistant experimenter. The subject having been directed to conceal, if possible, knowledge of the contents of the box which had been opened, was told to respond to each word of the list, as it was pronounced by the experimenter, by speaking as quickly as possible the idea which came into consciousness.

The experiment was then conducted as follows. The chronoscope having been set in motion by the assistant, the experimenter gave a ready signal and then pronounced distinctly the first word of the mouse-box list, at the same instant closing the key of the chronoscope circuit and thus starting a reaction-time record. The instant the subject pronounced an associated word (reaction word) the experimenter released the key and thus stopped the recording hands of the chronoscope.¹ Immediately the assistant read and recorded the position of the hands on the dial of the chronoscope. As soon as this had been accomplished, the experimenter pronounced the second word of the mouse-box list, and so on until the chronoscope had run down. Usually five reaction times could be measured without

¹The experimenter was an experienced reactor and the uniformity of his reactions made it seem desirable that he react to both the stimulus word and the reaction word. Had the subject instead of the experimenter reacted to the reaction word the reaction times might be somewhat shorter, but they would also be less reliable because of lack of previous training.

It may be objected that the experimenter's knowledge of the contents of the boxes influenced his reaction times, and thus determined the results of the experiment. We appreciated and met this danger in our second experiment, for in it the experimenter had no knowledge of what the subject had done and was unable to distinguish the significant from the irrelevant words of the list. As our results were positive in both experiment 1 and experiment 2, we feel confident that the experimenter's knowledge of the conditions of the first experiment did not render the results unreliable.

interruption for winding the instrument.¹ As soon as the mouse-box list had been completed, the card-box list was given in the same way.

Upon the completion of this initial experiment we tabulated and examined our results in the presence of the class, and, in the light of them, we were able to state with considerable confidence that the subject had opened the mouse-box instead of the card-box. As this conclusion proved to be correct it will be worth while for us now to examine the facts upon which our judgment was based.

In the accompanying lists of words some, it will be noticed, are marked with an asterisk. They refer to the contents of the box. To distinguish them from the other words of the series, which are properly described by the term *irrelevant*, we may speak of them as *significant*. The mouse-box series contained eight significant and twenty-two irrelevant words, but as the word squeak was misunderstood by the subject there were in effect only seven words which referred to the contents of this box. We planned to have one significant word to two irrelevant words in each series.

Beside the number of each word given (stimulus word) and the word itself the tables present the associated words (reaction words) given by the subject, and the reaction time. The latter we may, in order to be on safe ground, consider as reliable only to the second decimal place. Careful study of the associations which the two lists of words called out gives us little if any suggestion as to which box had been examined. But when we turn to the reaction times we meet with a strikingly different condition. As is shown in the general results for experiment 1, the average or mean for the irrelevant words of the mouse-box list was 1.775" while that for the significant words was 2.487". Apparently the significance of the words rendered their reaction times considerably longer than they would ordinarily have been. For the card-box list the difference between the reaction time for the two groups of words is only 0.125". Furthermore it is important to note that the variability, as well as the range, of reaction time is greater for the mouse-box list than for the card-box list.

Turning to individual words and their reaction times, we

¹ It has occurred to us since these experiments were performed that the Münsterberg chronoscope (readable to hundredths of a second) would be more satisfactory than the Hipp, because it can be used for ten minutes or more without interruption for winding. Professor Münsterberg, who, in his employment of the association reaction method for diagnostic purposes has made use of a stop-watch which could be read to fifths of a second, states that his readings are sufficiently accurate for practical purposes.

note that the irrelevant word rain, number 19 of the mouse-box list, was reacted to with the word clouds in 2.419", that the five consecutive significant words, small, white, dance, tail and rat, were reacted to with the words faucet, sink, book, horse and cat in 2.981", 2.830", 2.233", 1.948", and 3.208" respectively, and finally, that the immediately succeeding irrelevant word book was reacted to with the word paper in only 2.205". The word rat, following as it did a series of significant words, caused an inhibition or delay of reaction which was very noticeable indeed.

The attitude of the subject toward the experiment is indicated by the following brief introspective report. "I tried to give, as I understood I was expected to, the first association that came to mind. I endeavored, however, at the same time,

TABLE I
Mouse-Box List of Experiment 1

No. of Word	Stimulus Word	Reaction Word	Reaction Time
1	House	Dog	1.670 sec.
2	Sky	Blue	1.067
3	Tree	Green	1.340
4	Sun	Yellow	1.740
5	Flower	Blue	1.293
6	Boston	City	1.637
7	Man	Tail	.955
8	Harvard	Yard	1.758
9	Knife	Cut	1.600
10	Psychology	Study	1.675
11	*Box	Wood	2.117
12	*Movement	Machine	2.090
13	Squeak ¹	Sugar	3.146
14	Woman	White	1.906
15	Drink	Water	1.733
16	Room	Wood	2.098
17	Study	Book	1.381
18	Consciousness	Brain	2.234
19	Rain	Clouds	2.419
20	*Small	Faucet	2.981
21	*White	Sink	2.830
22	*Dance	Book	2.233
23	*Tail	Horse	1.948
24	*Rat	Cat	3.208
25	Book	Paper	2.205
26	Money	Color	1.206
27	Crime	Murder	2.205
28	Ground	Yellow	2.206
29	Companion	Woman	1.667
30	Home	House	1.697

¹ This word was understood to be sweet; hence the associated word sugar.

TABLE 2

Card-Box List of Experiment 1

No. of Word	Stimulus Word	Reaction Word	Reaction Time
1	Iron	Metal	1.731 sec.
2	Wolf	Animal	1.666
3	Wine	Red	1.295
4	Salad	Lettuce	1.845
5	Railroad	Rails	2.379
6	Orange	Yellow	1.214
7	Ticket	Railroad-train	2.612
8	Journey	Steamer	1.499
9	Lonesome	Child	3.109
10	*Play	Earth	2.344
11	*Ace	Cards	1.480
12	*Diamonds	Brilliant	1.894
13	*Clubs	Ace of Clubs	2.690
14	Trump ¹	Box	3.116
15	Wind	Blow	2.057
16	Window	Light	1.416
17	Dog	Yellow	2.100
18	Apple	Red	1.475
19	Fish	Swim	1.706
20	*Box	Trunk	2.146
21	*Lid	Trunk	2.271
22	*Open	Book	1.384
23	Black	Coat	1.072
24	*King	Queen	2.025
25	*Jack	Cards	1.398
26	*Hearts	Cards	1.798
27	Sleep	Tired	1.664
28	Morning	Light	1.387
29	Home	House	1.365
30	Friends	Many	1.655

to put out of mind all thought of my experiences with the boxes."

In the light of the reaction times of this experiment there seemed to be good reason for concluding that the subject had opened the mouse box: hence our statement to that effect.

The unexpectedly definite and convincing results of this preliminary experiment led us further to test the value of the method in a slightly different way three days later, with the same class. In the meantime the members of the class, being deeply interested in the experiments, had discussed with the assistant experimenter and among themselves the method, our results, and various ways in which a subject might render the method useless. It is significant of the importance of the

¹ This word was understood to be trunk; hence the associated word box.

TABLE 3
Quantitative Results of Experiment 1

Reaction-Time Values for Mouse-Box List			Reaction-Time Values for Card-Box List		
	Irrelevant Words	Significant Words	Irrelevant Words	Significant Words	
Mean	1.775"	2.487"	1.818"	1.943"	
Mean Var.	.366	.445	.449	.352	
Difference in Means +0.712			+0.125		
Short	.955	1.948	1.072	1.384	
Extremes					
Long	2.914 ¹	3.208	3.109 ²	2.690	
Max. Range	2.253"		1.618"		

method, that, despite this discussion, it continued to yield positive results.

EXPERIMENT 2

Our task in experiment 2 was to discover which of two subjects had performed a certain series of acts. With the apparatus arranged as previously, and with the list of one hundred words which appears in table 4 prepared, we chose two members of the class, Mr. L. and Mr. W., as subjects. These individuals were then directed to take a folded note and leave the classroom. When out of sight and hearing of those of us who remained in the classroom they were to decide which one of them should open the note and carry out certain written directions which it contained. They were clearly told that only one of them should know anything about the contents of the note, and that they should make it their business to prevent the experimenters from discovering which of them had the information that would be gained by following the written directions which are appended.

"Go to the shop, place a hammer in a drawer which is indicated by the mechanic, and carefully examine the articles in the drawer so that you can answer correctly the following

¹Omitting the reaction time for word number 13 (squeak) because it was misunderstood.

²Omitting the reaction time for word number 14 (trump) because it was misunderstood.

questions: How many keys are on the key ring? What is the label on the ink bottle? Is the ink bottle empty? Is the stop-watch running? What is the number on the back of it? How many blades has the knife? Are they sharp? What is the color of the handle? Can you pull small nails with the hammer?"

One at a time, the two subjects returned to the classroom and were tested for their knowledge of this series of questions.

The results which appear in table 4 demand little comment, but they deserve careful study. We may briefly call attention to the chief grounds of our conclusion that Mr. L. instead of Mr. W. carried out the directions.

First, the significant words caused considerable delay of reaction in Mr. L.'s case and none whatever in Mr. W.'s. Second, the variability of the reaction time to the significant words was greater than that for the irrelevant words in Mr. L.'s case, whereas it was less in Mr. W.'s case. Third, the range of reaction times was considerably greater for Mr. L. than for Mr. W. And, fourth, certain significant words caused very obvious inhibition in the reactions of Mr. L.

Especially important in this experiment are the reactions of Mr. L. to the three significant words Carter's, stopper, blotter which immediately followed the irrelevant word hawk (No. 21). For the latter the reaction time was only 1.873", for Carter's it increased to 2.279", for stopper it was 2.059", for blotter 3.386", and for the irrelevant word meat, which followed blotter, it suddenly dropped to 2.129". The inhibition of reaction caused by the word blotter is explained by the introspective report of Mr. L. He had prepared himself for the experiment by thinking over words which might appropriately be associated with the objects which he had seen. For the word blotter he had, as it chanced, no word ready. It took him completely by surprise, and his reaction time was so long that he at once decided that his case was lost. This change in Mr. L.'s attitude toward the experiment manifested itself in the reaction times to the remaining words of the list. The results of the second part of table 5 show that after the first twenty-five words, among which occurred the words stopper, Carter's, and blotter, the significant words of the list caused little delay in reaction. These averages for the reaction times of the series by twenty-fives are worthy of careful examination. Among the first twenty-five words of the list there were twelve significant and thirteen irrelevant words. For the former the reaction time was more than half a second longer than for the latter in the case of Mr. L., and a twentieth of a second shorter in the case of Mr. W. The second group of twenty-five words contained eleven significant and fourteen irrelevant words. Mr.

TABLE 4
Results of Experiment 2

RESULTS FOR MR. W.				RESULTS FOR MR. L.	
No. of Word	Stimulus Word	Reaction Word	Reaction Time	Reaction Word	Reaction Time
1	Canary	Bird	1.021	Dog	1.289
2	Tea	Yellow	.979	Coffee	1.287
3	Bread	White	1.886	Butter	1.528
4	Dog	Animal	1.022	Cat	.876
5	Lily	Green	1.143	Pond	1.353
6	*Bottle	Green	1.227	Water	1.637
7	*Empty	Crack	1.412	Full	1.448
8	*Black	White	1.054	White	2.057
9	*Write	Figure	1.286	Dog	2.024
10	*Fluid	Paper	1.334	Water	1.580
11	Sparrow	Bird	1.229	Bird	1.170
12	Coffee	Black	1.506	Tea	1.655
13	Cow	Milk	1.274	Milk	1.169
14	Plum	Fruit	1.820	Purple	1.733
15	Door	Open	1.243	Closed	1.812
16	*Lock	Open	1.355	Key	2.017
17	*Rusty	Green	1.233	Nails	1.922
18	*Ring	Key	1.439	Key	.824
19	*Number	White	1.105	Two	2.771
20	Window	Open	1.506	Glass	1.543
21	Hawk	Black	1.187	Bird	1.873
22	*Carter's	Ground	1.375	White	2.279
23	*Stopper	Chair	.963	Bottle	2.059
24	*Blotter	Red	1.269	Paper	3.386
25	Meat	Cotton	1.136	News	2.129
26	Horse	Brown	.999	White	1.806
27	*Ticks	Clock	1.203	Watch	1.595
28	Floor	Open	1.562	Wax	1.893
29	Peach	Stone	1.196	Stones	1.795
30	*Keyhole	Open	1.309	Door	1.733
31	Apple	Seeds	1.573	Seeds	1.439
32	Violet	Violet	1.621	Purple	1.649
33	*Face	Brown	1.007	White	1.654
34	*Hands	Door	1.196	Clean	2.225
35	*Stop	Watch	1.120	Clock	2.165
36	*Set	Open	1.213	Gone	1.798
37	Chocolate	Brown	.971	Cream	1.719
38	Potatoes	White	1.496	White	1.463
39	*Blades	Green	1.696	Sharp	1.643
40	Cat	Grass	1.102	Dogs	1.559
41	Hen	Knife	1.589	Scratch	1.589
42	Soda	White	1.194	Water	1.279
43	Sugar	Glass	1.135	Sweet	1.120
44	*Second	Sugar	1.341	Hand	1.811
45	*Hour	Minute	1.331	Minute	1.637
46	Mouse	Cat	1.058	Trap	1.239
47	Orange	Tooth	1.245	Yellow	1.459
48	Ceiling	White	1.180	White	1.509
49	*Sharp	Dull	1.502	Corn	1.592
50	*Color	Color	1.513	Green	1.810

TABLE 4.—(Continued)
Results of Experiment 2

RESULTS FOR MR. W.				RESULTS FOR MR. L.	
No. of Word	Stimulus Word	Reaction Word	Reaction Time	Reaction Word	Reaction Time
51	Ostrich	Book	1.030	Plumes	1.464
52	Lemonade	Lemonade	1.648	Sweet	1.834
53	Pickles	Ball Game	1.561	Sharp	1.417
54	Elephant	Animal	1.278	Trunk	1.285
55	Daisy	Flower	1.174	Ox-eye	2.168
56	*Open	Closed	1.118	Shut	1.260
57	*Handle	Door	1.359	Blades	2.155
58	*Cut	Rat	1.102	Dog	1.340
59	*Three	Green	1.587	Six	1.900
60	Roof	Wall	2.613	Green	1.828
61	Pike	Toll	1.749	Road	1.595
62	Dove	Round	1.064	Fly	1.619
63	Beer	Floor	1.128	Foam	1.615
64	Soup	Tomato	1.761	Turtle	1.976
65	Wolf	Wall	1.063	Snarl	1.817
66	Grapes	Glass	1.313	Purple	1.705
67	Wind	Hard	1.562	Blow	1.624
68	*Time	Short	1.404	Minute	1.731
69	*Clean	Board	1.355	White	1.420
70	Chimney	Short	1.530	Smoke	1.302
71	Shark	Smoke	1.306	Bite	1.568
72	Wine	Green	1.426	Milk	2.026
73	Chicken	Hen	1.309	Hen	1.463
74	Rat	Cat	1.081	Trap	1.219
75	Cherries	Stones	1.665	Red	1.708
76	*Hatchet	Axe	1.514	Cut	1.368
77	*Drawer	Red	1.270	Open	1.239
78	Whale	Yellow	1.199	Bone	1.638
79	Ale	Wine	1.103	Beer	1.705
80	Pepper	Potatoes	1.314	Sharp	1.817
81	*Pickup	Key	1.160	Drop	1.809
82	*Open	Paper	1.098	Close	1.237
83	Book	Door	1.053	Shut	1.734
84	Place	Table	1.004	Room	1.155
85	Close	Paper	1.056	White	1.260
86	Steps	Pen	1.192	Down	1.346
87	Swan	Pencil	1.236	White	1.279
88	Goat	Table	.929	Butt	1.751
89	Salad	Bird	1.100	Dressing	1.128
90	Water	Tool	1.150	Drink	1.417
91	Figs	Sharp	1.150	Sweet	1.729
92	*Nail	Box	1.185	Door	1.278
93	*Drive	Hatchet	.955	In	1.283
94	*Pull	Crayon	1.013	Out	1.106
95	Ocean	Hinges	1.246	Green	1.386
96	*One	Pencil	1.046	Six	1.585
97	Ship	Pencil	1.004	Sail	1.464
98	*Ten	Hammer	1.144	Dozen	1.336
99	Boy	Door	.940	Girl	1.214
100	Home	Door	1.359	Down	1.765

TABLE 5

Quantitative Results of Experiment 2

RESULTS FOR MR. W.			RESULTS FOR MR. L.	
	Irrelevant Words	Significant Words	Irrelevant Words	Significant Words
Mean	1.293"	1.258"	1.551"	1.729"
Mean Var.	.224	.145	.221	.343
Difference in Means, -0.035"			+0.178"	
Extremes	Short	.929	.876	.824
	Long	2.613	2.168	3.386
Max. Range	1.684"		2.562"	

Means, and Differences in Means, for the series of Reaction Times by quarters.

1st Quarter (25 words) Difference	1.304"	1.254	1.494"	2.000"
	-0.050		+0.506	
2nd Quarter Difference	1.280	1.312	1.537	1.788
	+0.032		+0.251	
3rd Quarter Difference	1.435	1.321	1.644	1.634
	-0.114		-0.010	
4th Quarter Difference	1.127	1.154	1.493	1.360
	+0.027		-0.133	

L.'s reaction time to the former was about a quarter of a second longer than his reaction time to the latter; Mr. W.'s times differed by only thirty-two thousandths of a second. In the third and the fourth groups of twenty-five, the significant words were reacted to by Mr. L. even more quickly than the

irrelevant words. This marked difference in the results for the first and the second halves of the list of stimulus words is intelligible in the light of Mr. L.'s introspective statement. "I tried," he writes, "to put myself into another state of mind in order not to reveal my knowledge of the facts. I thought over words that might be associated with the objects I had seen, and tried to make my association reaction time slow and uniform. I had not thought of the blotter and was unprepared for it. The delay which it caused made me feel that there was no use in trying to conceal my knowledge."

Mr. W. gives the following account of his attitude toward the experiment: "When I entered the classroom I was not guilty of carrying out the directions. I tried to make my associations quickly and uniformly. Several times a word, generally the name of some object before me, came to my mind before the stimulus word was given by the experimenter, and I pronounced this word, although possibly it had no connection whatever with the word given to me. I did not try to trick the experimenters except when I tried to think of some objects which Mr. L. would be likely to see in the shop. I mentioned some of these objects with the idea that possibly the experimenters would be led to think I knew a little about the series of acts. I had no reason for acting in any other than my ordinary manner."

The basis for our judgment concerning the facts revealed by this experiment is even more satisfactory than that furnished by experiment 1. Indeed the case against Mr. L. was clear before the experiment had been completed.

Subsequently, still further to test the reliability of our results, we repeated these two experiments with subjects who had considerable knowledge of psychology.

EXPERIMENT 3.

Experiment 3 is essentially a repetition of experiment 1, but with the substitution of certain words which promised to be more satisfactory than some that occurred in the lists of tables 1 and 2. In each list of thirty words ten significant words were given. The subject, a graduate student in Harvard University, was told to give the associated idea quickly, but to do his best to prevent the experimenters from discovering which of the two boxes he had opened. The test was conducted as the others had been, except that there was no class present in the experiment room.

An examination of the averages, variabilities, and ranges for this experiment as they appear in table 6 indicates that we have a less satisfactory basis for our conclusion than in either

of the previous experiments.¹ There are no indications of the inhibitory influence of the significant words of either list. The greater variability and range of the reaction-times to the mouse-box series might indicate that it had been opened; but, on the other hand, since this series was the first to be given it might reasonably be urged that lack of practice on the part of the subject accounts for the greater variability and range. And so we are left uncertain. As a matter of fact both experimenters finally decided, incorrectly, that the card-box had been opened. But they also decided (and this is of prime importance) that the subject had not given associations that were suggested by the stimulus words. Examination of the reaction words indicated that most of them were suggested either by objects in the room or by earlier words of the series. In the light of this fact the only possible conclusion would be that fear of detection of the truth had caused the subject to refuse to follow the directions which were given. The experiment is inconclusive so far as knowledge of which box had been opened is in question, but it furnishes very interesting and important information concerning the subject's mental content.

TABLE 6
Quantitative Results of Experiment 3

Results for Mouse-Box List			Results for Card-Box List	
	Irrelevant Words	Significant Words	Irrelevant Words	Significant Words
Mean	1.542"	1.471"	1.324"	1.389"
Mean Var.	.330	.223	.174	.112
Difference in Means, — 0.071"			+0.068"	
Short Extremes Long	.805	.768	1.006	1.184
	3.037	1.994	2.340	1.616
Max. Range	2.232		1.334	

Had this subject given us true associations instead of ideas which had come to him before the stimulus word was given, we should almost undoubtedly have obtained results similar to those of experiments 1 and 2.

¹ The detailed results of experiments 3 and 4 are not presented, since they offer little in addition to what appears in the other tables.

Perhaps the most interesting feature of the general results of experiment 3 is the high variability of the mouse-box reaction times. If practice had been excluded by previous training, this would have suggested knowledge of the contents of that box. Although we did not get what we set out to get in this experiment, the results would seem to indicate that no matter what method a subject chooses to conceal his knowledge, he is sure to give the experimenters some clue which if followed up skillfully will reveal the truth.

EXPERIMENT 4

Experiment 2 was repeated, as experiment 4, with the list of words reduced to fifty, of which twenty were significant. The list was otherwise changed slightly from the original, by the substitution of certain words. The subjects for experiment 4 were Mr. G., the subject in experiment 3, and another graduate student in Harvard whom we may refer to as Mr. M.

The results of this experiment were definitely positive, for it was clear that Mr. M. instead of Mr. G. had knowledge of the series of acts. This was indicated as strongly by the fact that many of his associations referred to objects in the drawer, as by the inhibitory influence of the significant words and the great variability of their reaction times.

TABLE 7
Quantitative Results of Experiment 4

Results for Mr. G.			Results for Mr. M.	
	Irrelevant Words	Significant Words	Irrelevant Words	Significant Words
Mean	1.340"	1.369"	1.853"	2.269"
Mean Var.	.251	.159	.181	.307
Difference in Means	+0.029		+0.416	
Short Extremes Long	.860	1.063	1.479	1.773
	2.585	1.764	2.278	3.106
Max. Range	1.725		1.627	

Finally, in table 8, we have brought together the mean variabilities and maximum ranges¹ for the reaction times of

¹It is to be noted that as the maximum range we give the difference between the shortest and the longest reaction-time of the series.

the several experiments. As experiment 3 did not conform to the conditions prescribed for the tests its results have not been included in the general averages of this table.

TABLE 8
General Quantitative Results of Experiments

	Objects or Acts Known to Subject		Objects or Acts Unknown to Subject	
	Mean Variabilities		Mean Variabilities	
	Irrelevant Words	Significant Words	Irrelevant Words	Significant Words
Experiment				
1	.366"	.445"	.449"	.352"
2	.221	.343	.224	.145
3	.330	.223	.174	.112*
4	.181	.307	.251	.159
Average	.256	.365	.308	.219
	Maximum Range		Maximum Range	
Experiment				
1	2.253		1.518	
2	2.562		1.684	
3	2.232		1.334*	
4	1.627		1.725	
Average	2.147"		1.642"	

*Results for Experiment 3 are not included in the averages.

In conclusion we would say that although there are obviously many environmental and subjective factors whose relation to the results of an association reaction-time experiment must be known before the method can be considered reliable, this does not seem to us a fit place to enter upon a discussion of them. It has been our sole purpose in this paper to show that under ordinary conditions and with ordinary skill in experimentation we have succeeded in demonstrating to a class, much to the surprise and satisfaction of its members, that a simple list of associations and their reaction times may reveal intensely interesting facts concerning the content of consciousness.

LITERATURE ON TATBESTANDSDIAGNOSTIK

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